

We claim:

1. A compound comprising a CD23-binding peptide wherein said peptide comprises an amino-acid sequence of  $X_1$ - $X_2$ - $X_3$ - $X_4$ - $X_5$ - $X_6$ - $X_7$ - $X_8$ , wherein:

$X_1$  is Phe, or is absent;

5  $X_2$  is His or Ala;

$X_3$  is Glu, Ser, Ala, Asn, Lys, or Cys;

$X_4$  is Asn, Phe, Gln, Pro, Ser, or Ala;

$X_5$  is Trp;

$X_6$  is Pro, Arg, Glu, Gly, Cys, or Lys;

10  $X_7$  is Ser, Pro, Leu, Thr, Ala, Gly, Asn, or absent; and

$X_8$  is Phe, Gly, or is absent.

2. The peptide according to Claim 1, wherein  $X_1$  is Phe,  $X_2$  is His,  $X_6$  is Pro, and  $X_8$  is absent.

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3. The peptide according to Claim 2, wherein said peptide is selected from the group consisting of:

$X_1$ -  $X_2$  -  $X_3$  -  $X_4$  -  $X_5$ -  $X_6$  -  $X_7$

Phe-His-Glu-Asn-Trp-Pro-Ser (SEQ ID NO:1);

20 Phe-His-Glu-Phe-Trp-Pro-Thr (SEQ ID NO:2);

Phe-His-Ser-Gln-Trp-Pro-Asn (SEQ ID NO:3);

Phe-His-Glu-Asn-Trp-Pro (SEQ ID NO:4);

Phe-His-Glu-Asn-Trp-Pro-Thr (SEQ ID NO:5); and

Phe-His-Glu-Gln-Trp-Pro-Ser (SEQ ID NO:6).

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4. The peptide according to Claim 1, wherein  $X_1$  is absent,  $X_2$  is His,  $X_4$  is Asn,  $X_6$  is Pro, and  $X_7$  is Ser.

5. The peptide according to Claim 4, wherein said peptide is selected from the group consisting of:

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$X_1$ -  $X_2$  -  $X_3$  -  $X_4$  -  $X_5$ -  $X_6$  -  $X_7$ -  $X_8$

His-Glu-Asn-Trp-Pro-Ser (SEQ ID NO:7);

His-Lys-Asn-Trp-Pro-Ser (SEQ ID NO:8); and  
His-Glu-Asn-Trp-Pro-Ser-Phe (SEQ ID NO:9).

- 5           6.     The peptide according to Claim 1 wherein said peptide is  
Phe-His-Lys-Pro-Trp-Arg-Ala (SEQ ID NO:10).
7.     The peptide according to Claims 1 to 6 wherein said peptide comprises an  
N-terminus and wherein said N-terminus is acylated.
- 10          8.     The peptide according to Claim 7 wherein said N-terminus is acetylated.
9.     The peptide according to Claims 1 to 6 wherein said peptide comprises a C-  
terminus and wherein said C-terminus is amidated.
- 15          10.    A polypeptide comprising the peptide according to Claim 1 to 6, wherein  
said polypeptide comprises from about 6 to about 100 amino acids.
11.    The polypeptide according to Claim 10, wherein said polypeptide comprises  
from about 6 to about 70 amino acids.
- 20          12.    The polypeptide according to Claim 11 wherein said polypeptide comprises  
from about 6 to about 15 amino acids.
13.    The compound according to Claims 1 to 6 and 10 having a specific binding  
25 to CD23 of at least about  $10^{-6}$  M.
14.    A pharmaceutical composition comprising at least one compound according  
to any one of Claims 1 to 6 and a pharmaceutically acceptable carrier.
- 30          15.    A method of manufacturing a medicament for the treatment or prophylaxis  
of a disease or disorder related to the biological activity of CD23, comprising incorporation

of a compound according to any one of Claims 1 to 6 in the manufacture of said medicament.

16. The method according to Claim 15 wherein the disease or disorder is  
5 selected from the group consisting of auto-immune diseases, chronic inflammatory diseases and allergies.

17. The method according to claim 15, wherein said disease or disorder is  
selected from the group consisting of arthritis, lupus erythematosus, Hashimoto's  
10 thyroiditis, multiple sclerosis, diabetes, uveitis, dermatitis, psoriasis, urticaria, nephrotic syndrome, glomerulonephritis, inflammatory bowel disease, ulcerative colitis, celiac disease, Crohn's disease, Sjogren's syndrome, allergies, allergic asthma, intrinsic asthma, acute asthmatic exacerbation, rhinitis, eczema, endometriosis, graft versus host disease (GVH), chronic obstructive pulmonary disease (COPD), insulinitis, bronchitis (particularly  
15 chronic bronchitis), diabetes (particularly type 1 diabetes), B-CLL and other B-cell malignancies, diseases related to B cell malfunctions, and Parkinson's disease.

18. A method of treatment or prophylaxis of a disease or disorder related to the biological activity of CD23, comprising providing a subject having said disease or disorder  
20 and treating said subject with a compound according to any one of Claims 1 to 6.

19. The method according to Claim 18 wherein the disease or disorder is selected from the group consisting of auto-immune diseases, chronic inflammatory diseases and allergies.

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20. The method according to claim 18, wherein said disease or disorder is selected from the group consisting of arthritis, lupus erythematosus, Hashimoto's thyroiditis, multiple sclerosis, diabetes, uveitis, dermatitis, psoriasis, urticaria, nephrotic syndrome, glomerulonephritis, inflammatory bowel disease, ulcerative colitis, celiac  
30 disease, Crohn's disease, Sjogren's syndrome, allergies, allergic asthma, intrinsic asthma, acute asthmatic exacerbation, rhinitis, eczema, endometriosis, graft versus host disease (GVH), chronic obstructive pulmonary disease (COPD), insulinitis, bronchitis (particularly

chronic bronchitis), diabetes (particularly type 1 diabetes), B-CLL and other B-cell malignancies, diseases related to B cell malfunctions, and Parkinson's disease.

21. An isolated polypeptide comprising an amino acid sequence selected from  
5 the group consisting of:

- a) a polypeptide comprising an amino acid sequence of SEQ ID NO: 1-10;
- b) a polypeptide comprising an amino acid sequence at least about 83% identical to an amino acid sequence of SEQ ID NO: 1-10;
- 10 c) a biologically active fragment of a polypeptide having an amino acid sequence of SEQ ID NO: 1-10; and
- d) an immunogenic fragment of a polypeptide having an amino acid sequence of SEQ ID NO: 1-10.

15 22. An isolated polynucleotide encoding a polypeptide of claim 21.

23. An isolated polynucleotide of claim 22, having a sequence of SEQ ID NO:  
11-20.

20 24. A recombinant polynucleotide comprising a promoter sequence operably linked to a polynucleotide of claim 23.

25. A cell transformed with a recombinant polynucleotide of claim 24.

25 26. A transgenic organism comprising a recombinant polynucleotide of claim  
24.

27. A method for producing a polypeptide of claim 21, the method comprising:  
a) transforming a cell with a recombinant polynucleotide, wherein said  
30 recombinant polynucleotide comprises a promoter sequence operably linked to a polynucleotide encoding the polypeptide of claim 21;

- b) culturing said cell under conditions suitable for expression of the polypeptide ; and
- c) recovering the polypeptide so expressed.

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- a) a polynucleotide comprising a polynucleotide sequence of SEQ ID NO: 11-20;
- b) a polynucleotide having a sequence complementary to a  
10 polynucleotide of a); and
- c) an RNA equivalent of a) or b).

29. A diagnostic test in a biological sample for a condition or disease related to the biological activity of CD23 comprising the steps of:

- 15 a) combining the biological sample with a polypeptide of claim 21, under conditions suitable for the polypeptide to bind CD23 and form a complex; and
- b) detecting the complex, wherein the presence of the complex correlates with the presence of CD23 in the biological sample.

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30. An expression vector comprising a sequence according to claim 22 wherein said vector is capable of expressing said polynucleotide.

25           31. A pharmaceutical composition comprising an expression vector according to claim 22 and a pharmaceutically acceptable carrier.

32. A polypeptide of Claim 21 wherein said polypeptide is labelled with a detectable marker.

30           33. A method of detection of CD23 comprising:

- b) treating said sample with a polypeptide of Claim 32; and
- d) detecting the amount of said polypeptide bound to said sample.

34. The method of Claim 33 wherein said sample comprises a cell.

35. A peptidomimetic of a peptide according to Claims 1 to 6.

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36. The peptidomimetic according to Claim 35, wherein said peptidomimetic comprises at least one amino acid which is a D-isomer.

37. The peptidomimetic according to Claim 35, wherein said peptidomimetic is  
10 a retroinverted peptide.

38. The peptidomimetic according to Claim 37, wherein said peptidomimetic comprises the D-amino acid sequence: spwneh.

15 39. The peptidomimetic of Claim 35, wherein said peptidomimetic is cyclic.

40. The compound according to Claim 35 having a specific binding to CD23 of at least about  $10^{-6}$  M.

20 41. A pharmaceutical composition comprising at least one compound according to Claim 35 and a pharmaceutically acceptable carrier.

42. A method of manufacturing a medicament for the treatment or prophylaxis of a disease or disorder related to the biological activity of CD23, comprising incorporation  
25 of a compound according to Claim 35 in the manufacture of said medicament.

43. The method according to Claim 42 wherein the disease or disorder is selected from the group consisting of auto-immune diseases, chronic inflammatory diseases and allergies.

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44. The method according to claim 42, wherein said disease or disorder is selected from the group consisting of arthritis, lupus erythematosus, Hashimoto's

thyroiditis, multiple sclerosis, diabetes, uveitis, dermatitis, psoriasis, urticaria, nephrotic syndrome, glomerulonephritis, inflammatory bowel disease, ulcerative colitis, celiac disease, Crohn's disease, Sjogren's syndrome, allergies, allergic asthma, intrinsic asthma, acute asthmatic exacerbation, rhinitis, eczema, endometriosis, graft versus host disease  
5 (GVH), chronic obstructive pulmonary disease (COPD), insulinitis, bronchitis (particularly chronic bronchitis), diabetes (particularly type 1 diabetes), B-CLL and other B-cell malignancies, diseases related to B cell malfunctions, and Parkinson's disease.

45. A method of treatment or prophylaxis of a disease or disorder related to the  
10 biological activity of CD23, comprising providing a subject having said disease or disorder and treating said subject with a compound according to Claim 35.

46. The method according to Claim 45 wherein the disease or disorder is selected from the group consisting of auto-immune diseases, chronic inflammatory  
15 diseases and allergies.

47. The method according to claim 45, wherein said disease or disorder is selected from the group consisting of arthritis, lupus erythematosus, Hashimoto's thyroiditis, multiple sclerosis, diabetes, uveitis, dermatitis, psoriasis, urticaria, nephrotic  
20 syndrome, glomerulonephritis, inflammatory bowel disease, ulcerative colitis, celiac disease, Crohn's disease, Sjogren's syndrome, allergies, allergic asthma, intrinsic asthma, acute asthmatic exacerbation, rhinitis, eczema, endometriosis, graft versus host disease (GVH), chronic obstructive pulmonary disease (COPD), insulinitis, bronchitis (particularly chronic bronchitis), diabetes (particularly type 1 diabetes), B-CLL and other B-cell  
25 malignancies, diseases related to B cell malfunctions, and Parkinson's disease.

48. A diagnostic test in a biological sample for a condition or disease related to the biological activity of CD23 comprising the steps of:

a) combining the biological sample with a peptidomimetic of claim 34,  
30 under conditions suitable for the peptidomimetic to bind CD23 and form a complex; and

b) detecting the complex, wherein the presence of the complex correlates with the presence of CD23 in the biological sample.

49. A peptidomimetic of claim 35 wherein said peptidomimetic is labelled with  
5 a detectable marker.

50. A method of detection of CD23 comprising:  
a) providing a sample;  
b) treating said sample with a peptidomimetic of claim 49;  
10 c) removing said peptidomimetic which is not bound to said sample;  
and  
d) detecting the amount of said peptidomimetic bound to said sample.

51. A isolated polypeptide or peptidomimetic selected from the group consisting  
15 of the peptides and peptidomimetics listed in Table 1 and Table 2.

52. A peptidomimetic according to claim 51 comprising the structure  
Ac-w-n-CO<sub>2</sub>H.  
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53. An isolated polynucleotide encoding a polypeptide of claim 51.

54. A recombinant polynucleotide comprising a promoter sequence operably  
linked to a polynucleotide of claim 53.  
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55. A cell transformed with a recombinant polynucleotide of claim 54.

56. A pharmaceutical composition comprising at least one polypeptide or  
peptidomimetic according to Claim 51 and a pharmaceutically acceptable carrier.  
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57. A method of manufacturing a medicament for the treatment or prophylaxis  
of a disease or disorder related to the biological activity of CD23, comprising incorporation



of a polypeptide or peptidomimetic according to Claim 51 in the manufacture of said medicament.